



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

#4 Response 2635
4/5/04
(lu)

-----: Atty Dkt#: HOL-P1
In Re U.S. Patent Application Of

HOLDAWAY ET AL.

Serial No.: 09/827,579

: Examiner: Brown, Vernal U.

Filing Date: April 2, 2001

: Group No: 2635

Title: WIRELESS DIGITAL LAUNCH OR FIRING
SYSTEM

-----: November 24, 2003

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Technology Center 2600

RESPONSE TO OFFICE ACTION

Mail Stop: Non-Fee Response
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Office Action dated August 25, 2003, please take into consideration the Applicant's remarks comparing the cited prior art to the claims as submitted in the above-identified U.S. patent application

The Examiner has entered a rejection of Claims 1-12, 18, and 20 as unpatentable over Lay US Patent 5,734,968 in view of Marcoux US Patent 5,623,256, under 35 USC 103. Main Claim 1 (and Claims 18 and 20 with similar limitations) as submitted is paraphrased as follows (underlining added for emphasis):

1. A wireless digital launch or firing system comprising:
(a) a transmitter unit having a first transmitter element for generating a first radio-frequency (RF) signal ... and a second transmitter element for generating a second

RF signal ... different from ... the first RF signal;
(b) a receiver unit having: (i) a receiver circuit for receiving the RF signals transmitted by the transmitter unit ...; (ii) a digital processor for ... comparing them to stored first and second digital code sequences, said digital processor outputting an "enable" signal if the demodulated first digital code sequence matches the stored first digital code sequence, and an "actuate" signal if the demodulated second digital code sequence matches the stored second digital code sequence; (iii) a memory latch device which maintains a normally-off primary switch in an "on" condition once the memory latch device receives the "enable" signal from the digital processor; and (iv) a normally-off secondary switch which is set to an "on" condition when it receives the "actuate" signal from the digital processor, wherein, when both said primary and secondary switches are in the "on" condition, an electrical output is provided to actuate a launch or firing device.

In Lay US Patent 5,734,968, Lay very clearly states, as in column 2, lines 45 – 51, "the solenoid can only be actuated when: (a) receiver circuit 26 is receiving a signal corresponding to signal 34 and, (b) at the same time, receiver circuit 28 is receiving a signal corresponding to signal 36. Thus, both switches A and B of the Lay transmitter must be turned on in order for the two signals to be generated simultaneously and transmitted to the respective receiver circuits 26 and 28. Similar statements are made throughout Lay's description and claims, showing that he does not anticipate or include any methods beyond simultaneous enable and actuate signals through separate receiver circuits, in order to actuate an output device.

In contrast, as stated in main Claim 1, the present invention requires that the first RF signal be first received, decoded, matched, and processed to the memory latch device to turn it to "on" condition, before the second RF signal is received to turn on the secondary switch to "on" condition to actuate the launch or firing device. The invention system employs non-simultaneous enabling and actuation signals which can be communicated sequentially over a single transmitter, receiver, and radio channel. The enabling signal must precede the actuating signal, thereby allowing the device to be set to an "armed" state pending the sending of the second "firing" signal. This allows the system to be less expensive, as fewer transmitter and receiver circuits are required. The operator is not required to press two transmitter buttons each time a device is to be actuated. The enable signal need only be transmitted once before proceeding with the transmissions of successive actuating signals. This is important when a large quantity of actuations are required in rapid succession, as in a public fireworks display.

Moreover, the enable signal which precedes the actuate signal can be used to light or sound an "armed" indicator on the receiver, thereby warning personnel that actuation is imminent. Such a safety warning is not possible with the simultaneous enable and actuate signals described by Lay.

In Marcoux US Patent 5,623,256, Marcoux uses similar components, i.e., a radio transmitter and receiver, signals modulated with pulse code, demodulator, decoder, processor to compare the demodulated pulse code to a stored pattern, and memory to hold the stored pattern. These components are common to virtually every radio remote control system and are not unique to Marcoux. The Examiner cites the combination of Lay and Marcoux as teaching or anticipating the submitted claims. However, the combination of their teachings does not anticipate the system claimed in the present invention of using a radio channel to communicate successive "enable" and "actuate" commands to safely fire pyrotechnic devices or to actuate other hazardous devices. There is no mention of this type of architecture in either patent. Although the Examiner declares on page 5, paragraph 2, of the Office Action, "Lay suggests transmitting multiple control signals to the receiver", in fact Lay is specifically describing and claiming the simultaneous transmission of these signals on multiple separate radio channels, transmitters, and receivers. The claimed invention employs a sequential transmission of these signals which can be sent on a single radio channel. This architecture, purpose, and advantage is also not "obvious to one of ordinary skill in the art", as stated by the Examiner on page 3, paragraph 2 and elsewhere, as evidenced by the fact that, until the design of present invention system, virtually all remote control systems, with the exception of the one described by Lay, used a single transmitted "actuate" command to generate an output. If the invention architecture were obvious, it would be in widespread use in order to realize the considerable advantages.

The Examiner further entered a rejection of Claims 16, 17 and 19 over the above-noted Lay and Marcoux references in view of Boggs US Patent 6,094,079. As to Claim 16, however, Lay describes a method "for actuating multiple special effects devices" ~~which~~ on careful reading is shown to be very different from the present invention. Lay describes very clearly in column 3, lines 11-18, "instead of a single switch B, the transmitter of the FIG. 2 embodiment has a plurality of switches 46 through 51. Each of the switches 46-51 activates a

different tuning circuit whereby closure of each switch transmits a signal of a different frequency, and it will be understood that receiver circuitry 20 includes a plurality of second receiver circuits 28 with each such receiver circuit tuned to receive one of the secondary signals of different frequencies produced by closure of switches 46 to 51.” Thus, Lay does not teach “providing a plurality of outputs in sequence”. Lay teaches only a system for actuating a plurality of outputs, but there is no mention anywhere in his patent of actuating these outputs “in sequence”. In fact, he is describing a system for randomly actuating a plurality of outputs, one which requires a separate receiver circuit, transmitter circuit, fire button, and radio channel for each output. An enable signal must be transmitted simultaneously with each actuate signal, requiring another transmitter, receiver, and radio channel in addition to the foregoing. Marcoux does not disclose anything further than Lay. The Boggs et al. US Patent 6,094,079 describes a system for generating and applying a single steady-state analog signal, in particular, a DC current, to a single load, as evidenced in his disclosure of the invention in column 1, lines 49 – 51, “According to one aspect of the present invention, a driver for producing a desired pulse width modulated current through a load”, and lines 61 – 65, “According to another aspect of the invention, ... a driver control for selectively generating trigger signals to switch current through the load.” Note that in both aspects “load” is referenced in the singular, indicating that there is a single output from his system. This is also clearly shown in his Figure 1 and Figure 3, where there is a single output connected to a single load, 60. In contrast, Claim 16 calls for “providing a plurality of outputs in sequence”. It recites a means of distributing the “actuate” input pulses to the plurality of outputs, one at a time, in predetermined sequence. For example, the first actuate pulse is routed to output one, the second actuate pulse is routed to output two, the third to output 3, etc.

In the invention system, a plurality of outputs from a single radio channel and receiver may be actuated sequentially to a plurality of outputs, one at a time. Moreover, as to Claim 17 (and as shown in Fig. 8), each successive “actuate” signal can be electronically connected to the next sequential output, permitting a single receiver output to actuate a plurality of outputs under remote operator control. As a result, the invention system can be made less expensive, as only one transmitter and receiver circuit is required to enable and actuate an arbitrarily large plurality of outputs. This is important in electrically fired public fireworks

1 displays, where several hundred outputs are typically required. Smaller radio bandwidth is required, which results in easier communications regulatory compliance. Maintenance is simplified, and reliability is enhanced, as there are fewer interconnecting wires, and only one receiver and transmitter, instead of a plurality, need be aligned / calibrated. The operator control panel on the transmitter is simplified, as only two buttons are required on it, an "Enable" button, and an "Actuate" button, permitting implementation in a hand-held transmitter. The system described by Lay would become unwieldy and very expensive, because several hundred buttons would be required on the control panel to fire a public fireworks display. Further, the probability of operator error is diminished, as there is no chance of the operator forgetting which button was last pressed, or of accidentally pressing the wrong button and actuating the wrong output. The invention system forces the operator to follow the predetermined actuation sequence.

Finally, the additionally cited Angott US Patent 4,686,380, only discloses a "latch" which is common art for a switch which, when actuated, remains in the "on" state until a second actuation returns it to the "off" state. The claims of the present application is not claiming a "latch" per se but rather the use of the latch device to allow a first signal to arm the circuit for safety, then a second signal to actuate the launch or firing device.


In summary, Claims 1-20 are deemed to be patentably distinct over the cited prior art and in condition for allowance, and it is requested that a Notice of Allowance be issued therefor upon reconsideration.

This response is filed with a certificate of mailing within the time allowed for response, and with total and independent claims after amendment numbering within the limits originally paid for with the filing fee. However, if any fees are deemed to be due for acceptance of this response, authorization is hereby given to charge our Deposit Account No. 502633.

CERTIFICATE OF MAILING:

The undersigned certifies that the foregoing is being mailed on November 24, 2003, by depositing it with the U.S. Postal Service, first class postage paid, addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Respectfully submitted,
ATTORNEYS FOR APPLICANT

A handwritten signature in cursive script, reading "Leighton K. Chong". The signature is written in black ink and is positioned above a horizontal line.

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